9 Water Street, First Floor
Amesbury, Massachusetts 01913
978.792.5737

Memorandum

September 17, 2020

To: Malcolm Beeler, Weston and Sampson Engineers, Inc.

From: Amy Nelson, Anchor QEA

cc:

RE: Field Sampling Plan – Screening Level Ecological Risk Assessment (SLERA) Sampling, Town of Fairfield, Connecticut

Overview

This field sampling memorandum was prepared by Anchor QEA, LLC, for Weston and Sampson Engineers, Inc. (WSE) on behalf of the Town of Fairfield, Connecticut and presents the scope of surface sediment and surface water sampling to be performed in the waterbodies and marshes immediately adjacent to a reclamation yard owned by the Town of Fairfield, CT Department of Public Works on Richard White Way (Site; Figure 1). This sampling and analysis program is being conducted to further define the nature and extent of contamination and provide data to support a Screening Level Ecological Risk Assessment (SLERA) of the aquatic resources adjacent to the Site.

Background

The Site was originally reclaimed prior to 1971 and over 300,000 cubic yards of fill material was placed at the current location. Assuming a surface elevation of 28 feet (North American Vertical Datum 1988), an additional 120,000 cubic yards of fill has been placed at the Site following reclamation. These later fill materials were mostly transported to the Site after 2013.

Investigation of the reclamation and later fill materials have found that they are impacted with petroleum hydrocarbons, polyaromatic hydrocarbons (PAHs), and polychlorinated biphenyls (PCBs). Concentrations of petroleum hydrocarbons and PAHs are similar in the reclamation and later fill materials, but PCB concentrations are higher in the reclamation fill materials. Lead, arsenic and other metals are also present in the fill materials and are considered chemicals of concern.

A potential for off-site migration of impacted material exists, potentially having occurred from upland soils into the adjacent Pine Creek and associated marshes at any time following reclamation. This investigation of ecological risk support will include characterizing the nature and extent of off-site impacts specific to ecological risk through a SLERA.

Objectives

The objectives of the field sampling include the following:

- Provide data to assess risk to ecological receptors in Pine Creek and marshes immediately adjacent to the Site.
- Further define the horizontal and vertical extent of contamination, if any, within sediment and surface water.

The primary purpose of the field work detailed in this sampling plan is to collect sufficient data to conduct a SLERA. A SLERA provides a preliminary characterization of potential risks (e.g., comparison of site sediment data to screening levels). Results from a SLERA can then be used to support remedial actions (if deemed necessary) or to support a site-specific ecological risk assessment to reduce uncertainty in risk characterization.

The Connecticut Department of Energy and Environmental Protection (CT DEEP) does not currently provide state-specific guidance on conducting ecological risk assessments other than referring to standard U.S. Environmental Protection Agency guidance. This sampling plan and the subsequent SLERA for the Site will follow general guidance from federal agencies and nearby states where applicable and will draw from our experience with other impacted sediment sites.

Field Sampling Program

Approach

CT DEEP was contacted, and a Request for Natural Diversity Data Base (NDDB) State Listed Species Review submitted. The review performed by CT DEEP indicated that there were no species or habitat present that would limit sampling, but CT DEEP indicated that October and November would be the best time frame to perform sampling and a species protection plan will be developed for the final Field Sampling Program.

The sampling program targets surface water and sediment at the locations depicted in Figure 1. Samples will be distributed around the entire shoreline perimeter to understand rough extent of any potential contamination in the waterways and marshes. Select samples have been placed at locations where potential discharge from the Site to surface water may have occurred.

Water sampling should be conducted prior to sediment sampling to minimize the potential for introducing chemicals into the water column as a result of sediment resuspension by coring activities. Water samples will be collected from the mid-depth of the water column at approximately high tide. Sampling containers will be immersed directly into the water. Samples will be submitted along with appropriate quality assurance/ quality control (QA/QC) samples to be analyzed for PCBs PAHs CT extractable total petroleum hydrocarbons (CTETPH), and metals, as indicated in Table 1.

Sediment sampling will be conducted at ten locations spaced strategically across Pine Creek and associated marshes. Sediment samples will be collected using 3-inch diameter polycarbonate tubes (or similar) hand driven approximately 18 inches into the sediment. Upon retrieval, the core sample will be cut into two depth intervals (0.0 to 0.5-foot and 0.5 to 1-foot). Any sediment remaining (deeper than 1 foot) will be returned to the point of collection. Samples will be submitted along with appropriate QA/QC samples to also be analyzed for PCBs, PAHs, CTETPH, metals, grain size distribution, and TOC using the same methods listed above for the surface water samples as indicated in Table 1.

Sensitive Species Protection

According to information received from the CT DEEP (attachment 1), there are State-listed species documented nearby and within the Site investigation area. Per recommendation by CT DEEP in the Natural Diversity Database (NDDB) information request, a species protection plan will be developed to minimize disturbance of sensitive species.

Procedures

Water Sampling:

Three surface water samples will be collected for analysis plus additional QA/QC samples (i.e., field duplicate and matrix spike/matrix spike duplicate samples (Table 1)).

1. Use a global positioning system (GPS) to reach the target location[1].
2. Fasten a new, clean laboratory container (without any preservatives) to an extendable pole. Immerse the container directly into the water column near the center of the channel, taking care not to let the container contact the sediment. Repeat as needed to fill all required containers (see Table 1).
3. Record the sample location with a GPS. Record time of collection and physical characteristics of the waterbody (e.g. approximate water depth, approximate tidal phase, wind conditions, turbulent or laminar flow, etc.) at each location.
4. Label each sample with an adhesive plastic or waterproof paper label at the time of collection and added to the chain-of-custody (COC). Record the following information on the container label at the time of collection:
    a. Sample identification
    b. Date and time of sample collection
    c. Preservative type (if applicable)

[1] Coordinate system to be used is NAD83 Connecticut State Plane feet.

d. Analysis to be performed

5. Place samples collected for laboratory analyses in a cooler with wet ice prior to transport to the project laboratory where the samples will be analyzed as outlined in Table 1.

Sediment Sampling:

Sediment samples will be collected from ten locations and samples will be split into two depth intervals (0.0 to 0.5-foot and 0.5 to 1-foot). QA/QC samples (i.e., field duplicate and matrix spike/matrix spike duplicate samples (Table 1) will also be collected.

1. Use a GPS to reach the target location. Proposed sediment coring locations shown on Figure 1 are approximate. Waterway sampling locations may be moved laterally to areas with shallower water for easier collection of push cores from the boat depending on tidal conditions.

2. Record the sample location with a GPS. Record time of collection, general penetration resistance (i.e., soft or hard bottom surface), penetration depth, length of recovered sediment, and water depth at each location.

3. Push a new, dedicated 3-inch polycarbonate core tube into the sediment. A rubber mallet or small (e.g., 2 pound) hammer may be used to drive the tube into the sediment. If possible, drive the tube into the sediment approximately 18 inches, or more, to recover a minimum of 12 inches of sediment. If the top of the core tube is damaged during penetration, cut the top of the core tube off with a hacksaw to provide a smooth end, then cap, and pull the tube out of the sediment. Place a cap on the bottom of the tube before the bottom of the tube breaks the water surface. A similar procedure will be followed if another sampler device is utilized.

4. Decant water above the sediment in the tube prior to processing. Lay the core down, remove the end caps, and extrude top 0.5 feet of sediment into a new aluminum pan, photograph, and record the physical characteristics of the sample. Homogenize the sediment with a disposable tool, and place in a laboratory container. Repeat this process for the 0.5 to 1.0-foot interval. Return any unused sediment to the point of collection. Use a new pan and tool for each core.

5. Label each sample with an adhesive plastic or waterproof paper label labeled at the time of collection and added to the chain-of-custody (COC). Record the following information on the container label at the time of collection:

    a. Sample identification
    b. Date and time of sample collection

c. Preservative type (if applicable)
d. Analysis to be performed

6. Place samples collected for laboratory analyses in a cooler with wet ice prior to transport to the Alpha Analytical laboratory where the samples will be analyzed as outlined in Table 1.

Sample Location

Sample locations have been selected to (1) characterize sediments and surface water in the area of the Aggregate Reclamation Yard and (2) characterize sediments and surface water in areas where potential off-site migration of impacted materials exist. Specifically:

- ERA-SED3, ERA-SED8, and ERA-SW2 are all located at the potential stormwater discharge established after the Site was regraded.
- ERA-SED5, ERA-SW3, and ERA-SED10 are established at a point of likely stormwater discharge during the operational history of the Site. A review of historical aerials indicate that a "v"-like depression has existed at this location since the original reclamation. As such, it is likely that stormwater accumulated and ran off the Site at this location.

ERA-SED6, ERA-SED11, and ERA SW4 are all located in an area that should not have been impacted by Site operations. As such, they could potentially represent "background" conditions in the tidal marsh.

Table 1
Sampling Locations and Analysis

Sample ID	Objective	Sample Type	Analysis
ERA-SW1	Provide data to compare to CT aquatic life water quality guidelines	Water	PCBs by Method 8082, PAHs by high resolution SIM method, CTETPH, and metals.
ERA-SW2			
ERA-SW3			
ERA SW4			
Field Duplicate[1]	QC		
Matrix Spike/Matrix Spike Duplicate[1]	QC		PCBs, PAHs, CTETPH, metals
Rinse Blank	QC	DI water	PCBs, PAHs, CTETPH, metals
ERA-SED1	0.0 to 0.05-foot and 0.5 to 1.0-foot depth intervals for all locations: Provide data to compare to risk-based screening values and refine nature and extent of contamination.	Sediment	PCBs by Method 8082 with 3540C Soxhlet Extraction, PAHs by high resolution 8270 SIM method, CTETPH, metals, grain size distribution, and TOC by EPA Method 9060
ERA-SED2			
ERA-SED3			
ERA-SED4			
ERA-SED5			
ERA-SED6			
ERA-SED7			
ERA-SED8			
ERA-SED9			
ERA-SED10			
ERA-SED11			
Field Duplicate[1]	QC		
Matrix Spike/Matrix Spike Duplicate[1]	QC		
Rinse Blank	QC	DI water	PCBs, PAHs, CTETPH, metals

Notes:

1. A field duplicate and matrix spike/matrix duplicate will be collected at a frequency of 1 per 20 samples for each media.\

CT: Connecticut

CTETHP: CT extractable total petroleum hydrocarbons

DI: deionized water

mL: milliliter

PAH: polycyclic aromatic hydrocarbons

PCB: polychlorinated biphenyls

TOC: total organic carbon

QC: quality control

Project Team

The proposed project team is listed below. Changes in field staff may be required depending on the timing of project implementation and staff availability.

Table 2
Project Team

Project Team	Role	Contact Information
Sonnet Agran-St. Pierre, Anchor QEA	Sample Collection	Office: 978-378-6210
Nathan Kelsall, Anchor QEA	Field Lead	Office: 857-445-4979 Mobile: 315-559-7589
Amy Nelson, Anchor QEA	Project Manager	Office: 978-378-6215 Mobile: 978-973-7002
Alpha Analytical, Inc	Analytical Laboratory	Office: 800-624-9220
Malcolm Beeler, WSE	Licensed Environmental Professional	Office: 860-513-1473

Schedule

To minimize disturbance of sensitive species known or suspected to be in the vicinity of the area, the proposed schedule for SLERA sampling is October/November 2020. Sampling may be conducted during other times through incorporation of additional mitigation measures and/or adaptation of the sampling program.

Data Evaluation

Following the implementation of investigations described herein, the resulting field observations will be tabulated, and laboratory analytical data will be reviewed and validated. The analytical results will be added to a database and a SLERA report will be developed.

The SLERA report will summarize the investigation results, the ecological risk screening of results including evaluation of reference conditions, and the nature and extent of impacts within the shallow sediment. A sediment sample summary table (including date of collection, GPS coordinates, recovery, water depth, and general visual observations of sediment type and impacts) will be prepared. A similar surface water sampling summary table will be created with date of collection, GPS coordinates, water depth, and any observations.

A data gap analysis will be conducted to determine if there is sufficient information to conduct the SLERA. If data gaps are identified or if the SLERA indicates potential risk, additional sampling may be conducted.

DPW EMPLOYEE PARKING LOT

BUS PARKING LOT

EXISTING ACCESS DRIVE

UTILITY POLE

GATE

APPROXIMATE EXTENT OF MATERIALS HANDLING OPERATIONS BASED ON HISTORICAL AERIAL IMAGERY

APPROXIMATE LOCATION OF PCB REMOVAL ACTION

TP-1

TP-2

TP-3

TP-4

TP-5

TP-6

TP-7

TP-8

TP-9

TP-10

TP-11

TP-12

TP-13

TP-14

MW-1

MW-2

N/F TOWN OF FAIRFIELD

MULCHING/COMPOSTING

WETLAND SOIL

RICHARD WHITE WAY

WPCF WASTEWATER TREATMENT PLANT

ANIMAL CONTROL

CONSERVATION WORKSHOP

FIRE TRAINING

POTENTIAL EXTENT OF MATERIALS HANDLING OPERATIONS BASED ON HISTORICAL AERIAL IMAGERY

BERM

12' SERVICE ROAD

STORMWATER SEDIMENTATION BASIN

24" HDPE OUTLET

STORMWATER DISCHARGES ONTO SLOPE

PINE CREEK

N/F 1370 FAIRFIELD BEACH ROAD, LLC

ERA-SED1/ ERA-SW1

ERA-SED2

ERA-SED3/ ERA-SW2

ERA-SED4

ERA-SED5/ ERA-SW3

ERA-SED6/ ERA-SW4

ERA-SED7

ERA-SED8

ERA-SED9

ERA-SED10

ERA-SED11

LEGEND

- ELEVATION CONTOUR
- EDGE OF WATER
- EDGE OF BUILDING
- GRAVEL ACCESS ROAD
- APPROXIMATE EXTENTS OF MATERIALS HANDLING OPERATIONS
- STOCKPILE AREA FOR SUSPECT C&D MATERIALS
- BERM CONSTRUCTED FROM RELOCATED FILL MATERIALS
- STOCKPILE AREA FOR TREE DEBRIS AND MULCH THAT MAY CONTAIN C&D DEBRIS
- STORMWATER SEDIMENTATION BASIN AREA
- 20-FOOT SAMPLING GRID
- TEST PIT ALIGNMENT
- 60 TEST PIT STATIONING
- TEST PIT STATION POINT
- MONITORING WELL LOCATIONS

NOTES:

1. LINEWORK DERIVED FROM DRAWING TITLED "AS-BUILT AT AGGREGATE PILE 900 RICHARD WHITE WAY FAIRFIELD, CT" PREPARED BY THE TOWN OF FAIRFIELD DEPARTMENT OF PUBLIC WORKS ON DECEMBER 9, 2019.

2. ELEVATIONS ARE IN NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).

PROPOSED SAMPLE LOCATIONS

- SEDIMENT/SURFACE WATER
- SEDIMENT
- TIDAL MARSH SEDIMENT

ANCHOR QEA

FIGURE 1
TOWN OF FAIRFIELD, CONNECTICUT
AGGREGATE RECLAMATION YARD
PROPOSED SAMPLING LOCATIONS
1" = 50'

0 50 100

Rev. 1.7 Date: 08/12/2019

Connecticut Department of
ENERGY &
ENVIRONMENTAL
PROTECTION

79 Elm Street • Hartford, CT 06106-5127 www.ct.gov/deep Affirmative Action/Equal Opportunity Employer

August 21, 2020

Amy Nelson
Anchor QEA
9 Water St, First Floor
Amesbury , MA 01913
ANELSON@ANCHORQEA.COM

NDDB DETERMINATION NUMBER: 202009237

Project: Ecological Risk Assessment of Pine Creek tidal waterways and wetlands around former reclamation yard at Town of Fairfield Transfer Station, 183 RICHARD WHITE WAY, FAIRFIELD, CT

Expiration: August 21, 2022

I have reviewed Natural Diversity Database (NDDB) maps and files regarding this project. According to our records, there are State-listed species (RCSA Sec. 26-306) documented nearby and within the proposed project area. These species may have been impacted by the contamination on-site, and you should consult with a specialist to determine if there are specific remediation needs for these species. These species may also be disturbed by your remediation activities, and general recommendations are provided to avoid further impacts to these species during your work. A full protection plan should be created for these species for you to ensure that all impacts are mitigated and avoided. Please forward any more detailed mitigation or protection plans that address state listed species to deep.nddbrequest@ct.govand use #2020009237 with your correspondence.

Name	Common	Protection	Habitat of concern
Ardea alba	Great egret	Threatened	Saltmarsh, creeks
Egretta thula	Snowy egret	Threatened	Saltmarsh, creeks
Plegadis falcinellus	Glossy ibis	Special Concern	Saltmarsh, creeks
Nyctanassa violacea	Yellow-crowned night-heron	Special Concern	Saltmarsh, creeks
Ammodramus caudacutus	Saltmarsh sharp-tailed sparrow	Special Concern	Saltmarsh
Malaclemys terrapin terrapin	Northern diamondback terrapin	Special Concern	Saltmarsh, creeks, sandy upland areas
Asio otus	Long-eared owl	Endangered	Mixed conifer groves
Asio flmmeus	Short-eared owl	Endangered	Mixed conifer groves

Waterbirds in Saltmarsh:
The saltmarsh sharp-tailed sparrow is a tidal-marsh specialist breeds in Connecticut tidal-marsh habitat from mid-May through early August. Connecticut possesses a globally significant proportion of the breeding population of this species. Connecticut populations have experienced a significant decline in nesting success due to increased rates of nest flooding.

Egrets, herons, and ibis are birds that usually nest in a mixed species colony with other heron species, called a rookery. Of these rookery nesting species, Snowy egret has the highest regional concern due to rapidly decreasing populations. In Connecticut, rookeries are on offshore islands. Nests are typically built 20-40 feet above ground in trees. Breeding usually begins mid-April and runs through August. Disturbance to nesting rookeries by both predators and people is the main threat to this species in Connecticut, followed by degradation of wetland habitat used for foraging. Setback from nesting colonies of 660 feet (200 meters) for all activities during nesting season as well as reducing wetland disturbance and enhancing wetland function in foraging areas within 5 km of rookeries will benefit this species.

Your project falls in critical foraging habitat for the snowy egret and other herons, egrets, and ibis listed above. Critical foraging habitats preferred by these species include marshes, swamps, ponds, shores, and tideflats with a diet consisting of mainly fish and crustaceans. Foraging efficiency is greatly reduced if foraging individually. Do not disturb flocks of foraging herons and egrets. Do not introduce new excessive or unpredictable noise or activity to wetland complexes that will cause birds to flush during April-August, especially before 10am, when largest flocks will form.

If work must occur during the bird active season (**between April 1- August 30**) these guidelines will minimize impacts to species:

- Movement through the Marsh. While walking through the marsh, keep noise to a minimum. Avoid using multiple pathways through the marsh. Use trails if they exist. Plan and map your route to minimize environmental impacts and decrease running into hazards/barriers such as large channels. When looking for a suitable place to jump a channel, do not walk along the edge of the channel/slough. To find an alternate jump site, walk parallel to the channel at a distance where vegetation is lower in height and where visibility of the ground surface is greater. At all times, observe the environment you are walking through to avoid disturbance. Choose channel jump sites where vegetation is lower or you can clearly discern what you are jumping onto. In general, avoid walking adjacent and parallel to channels/sloughs.
- Avoiding nests and nest substrates. Tidal marsh species have nests that are well concealed and therefore easy to disturb when walking through the marsh. To avoid stepping on a nest, do not walk through thick vegetation or areas where you cannot see through to the ground. Avoid walking on vegetation whenever possible since plants serve as nesting substrate for many species in the marsh. In general, be aware of the area you are walking through.
- Bird Behavior. If a bird vocalizes or flushes within close range of where you are standing or walking (e.g., 10-m), it is possible that a nest or young are nearby. When these circumstances arise, stop whatever you are doing and leave the immediate area (be sure to watch where and what you are walking on). Choose an alternate route through the marsh, identify the new route and location of the sighting/occurrence on a map, and record coordinates of the location if possible. Be sure to pass this information on to others that may use the same route or are conducting surveys in the same area. Be very observant of where you walk as you leave the area. There exists the possibility that you could step on a nest or young, both of which can be concealed by vegetation or cryptic. When alarmed, individuals may freeze in place (especially juveniles). ☐
- Tidal lagoons/ponds. Avoid walking along tidal lagoons and ponds in marsh interiors that support foraging, roosting, or nesting shorebirds and waterfowl. Be observant of the distance at which birds flush or become alarmed.

- Tides. Avoid conducting surveys during high tides as much as possible. These are periods when many wildlife species are at greatest risk (e.g., predation). If your surveys require a high tide, be aware of the increased risk you may cause for wildlife and take all precautions to reduce that risk (e.g., avoiding areas where sensitive species are known to occur).

Northern diamondback terrapin

Northern diamond-backed terrapin is a turtle that inhabits salt marshes and salt or brackish tidal waters. They can also be found on mud flats, shallow bays, coves, and tidal estuaries. Adjacent sandy dry upland areas are required for nesting. Nesting takes place in June-July on salt marshes and adjacent beach areas. The peaks of hatching occurrences are April – June and September – November. This species overwinters in depressions in the bottoms of estuaries, creeks, and salt marsh channels composed of muddy and fine grain sediments.

To protect *hibernating* Northern diamonback terrapin *and* minimize disturbance of sensitive saltmarsh birds, conduct your marsh disturbance activities that **affect bottoms of estuaries, creeks, and salt marsh channels between August 1- November 1.** This will allow the turtle to move out of harms way. Ensure work activities will not create a barrier to turtle movements. No channels should be completely blocked to passage.

To protect *nesting* Northern diamond-backed terrapin, any construction, ground disturbance or clearing activities that will occur **on sandy habitat** or within 100 meters of these habitats should be done during the turtle's inactive period (**November 1- March 31**).

If work must occur during the turtle active season (Between April 1- October 31):

- All work personnel will be notified to be alert for the potential presence of the turtles and will be provided with a description of the species. Any turtle that may be discovered will be carefully moved, without harm, to a location outside the work area, and positioned in the same orientation that it had been moving. NO turtles will be removed or relocated from the area.
- No vehicles or machinery should be parked in any identified turtle habitat.
- Take special care to avoid harm to basking or foraging individuals during any work conducted in the early morning and evening hours.
- Report any observations of these turtles to our DEEP-NDDB Program at deep.nddbrequest@ct.gov as soon as possible.

Owl Roost

An owl roost is across the creek from your work area. An owl roost often consists of mixed conifer groves next to open areas. State listed owls identified to use this roost are especially secretive and sensitive to human disturbance during the harsh winter months. These owls will return to the same winter roost site year after year between the months of November- mid March. These birds benefit from the preservation and management of grasslands and emergent wetlands adjacent to conifer groves.

Do not introduce new traffic or noise to within 200m of an active winter roost between November 1- March 15.

In general, because this is an important area for birds, building or other structure characteristics should take the risk of collision into consideration. Develop a building façade and site design strategy to make the building and site structures visible barriers to birds. Limit interior and exterior night lighting. Security lighting should always be

down-shielded to keep light within the boundaries of the site. Take steps necessary to assure that construction is designed, built, and operated in accordance with the standards and requirements of the LEED Green Building Rating System Pilot Credit #55. The USGBC releases revised versions of the LEED Building Rating System on a regular basis, and you should refer to the most current version when beginning a new building or construction project or renovation.

Please report any observations or reports that document these or other state listed species to **deep.nddbrequest@ct.gov**.

Natural Diversity Database information includes all information regarding critical biological resources available to us at the time of the request. This information is a compilation of data collected over the years by the Department of Energy and Environmental Protection's Bureau of Natural Resources and cooperating units of DEEP, independent conservation groups, and the scientific community. This information is not necessarily the result of comprehensive or site-specific field investigations. Consultations with the NDDB should not be substituted for on-site surveys required for environmental assessments. Current research projects and new contributors continue to identify additional populations of species and locations of habitats of concern, as well as, enhance existing data. Such new information is incorporated in the NDDB as it becomes available.

Please contact me if you have any questions (shannon.kearney@ct.gov). Thank you for consulting with the Natural Diversity Database and continuing to work with us to protect State-listed species.

Sincerely,

/s/ Shannon B. Kearney
Wildlife Biologist